

Amendments to the Specification:

Page 2, after line 8 and before line 9, insert the following text:

Known Approach

In the second known approach referred to previously, system-level parameters for a mobile user terminal in a packet radio system are related to performance at communication link level by a variable C which is used to estimate the performance of the receiver in terms of frame error probability from pre-computed calibration data.

Consider a multiple input multiple output (MIMO) system by way of example. MIMO techniques are well known, and the reader is referred to, for example, S.M.Alamouti, "A Simple Transmit Diversity Technique for Wireless Communications", IEEE Journal on Selected Areas in Communication, Vol. 16, No. 8, pp. 1451-1458, October 1998 as background.

A MIMO system 12 is shown in Figure 2 consisting of a MIMO transmitter 14 having N transmit antennas 16 and a MIMO receiver 18 having M receive antennas 20. The transmitter 14 is one of a base station and a mobile user terminal. The corresponding MIMO receiver 18 is the other of the base station and the mobile user terminal. A data block to be transmitted is encoded and modulated to provide symbols of a complex constellation. Each symbol is then mapped to the transmit antennas 16 (a process known as spatial multiplexing) after some spatial weighting of the signal components to the various transmit antennas, known in the art as space-time coding. After transmission over air, i.e. through the wireless channel, signals received at the receiver by the various receive antennas 20 are demultiplexed, weighted, demodulated and decoded in order to recover the transmitted data.

In this MIMO system 12, a radio packet is received via the $N \times M$ channel matrix \mathbf{H} , in the presence of additive white Gaussian noise of energy N_0 , E_b being the bit energy. Specifically the frame error probability (FER) (for a particular communication link, is derivable from the channel matrix \mathbf{H} , interference channel matrices $\mathbf{H}_1 \dots \mathbf{H}_K$ and thermal noise energy N_0 . No structured (i.e. systematic) interference is assumed present so $\mathbf{H}_1 \dots \mathbf{H}_K$ are not considered.

Many computer simulations of the MIMO system 12 were run, specifically of the extent to which a transmitted frame 22 would be received for the selected \mathbf{H} and selected average signal to noise ratio (E_b/N_0), the instantaneous noise varying randomly over time around an average with a Gaussian distribution. For each simulation, comparison of the simulated-received frame 24 to the

simulated-transmitted frame 22 enabled a count to be made of what fraction of the simulated-received frames included at least one error, thus giving a frame error probability (FER) value.

The next step is to determine the channel capacity C to which the FER value is related. This was done by assuming FER to be a function of variable C as follows:

$$FER = \Pr \left\{ \text{Frame Error} \mid \mathbf{H}, \frac{E_b}{N_o} \right\} = f(C(\mathbf{H}, E_b, N_o)) \quad (1)$$

enabling calibration curves of the form $FER(C)$ to be produced where

$$C = C(\mathbf{H}, E_b, N_o) \quad (2)$$

is a scalar variable. C is channel capacity of the MIMO channel \mathbf{H} , and is determined from a MIMO channel matrix \mathbf{H} as:

$$C = \log_2 \det \left(\mathbf{I}_N + \frac{1}{M} \frac{E_b}{N_o} \mathbf{H} \mathbf{H}^H \right) \quad (3)$$

(This is the so-called Shannon capacity formula extended to the MIMO case). C is the channel capacity expressed in bits per second per Hertz (bps/Hz) for a MIMO channel \mathbf{H} with N transmit antennas, M receive antennas, and an average signal to noise ratio of E_b/N_o .

Accordingly, from the above-mentioned simulations, data of FER against C were produced for various average signal to noise ratio. These data are look-up data i.e. calibration data to be used to estimate FER for real MIMO systems from determination of a C value.

The use of the variable C to determine FER for a link of a real network is shown in Figure 3. For example, by sampling at regular time intervals (e.g. once per slot) how signals, namely pilot signals, expected by a mobile user terminal are received by the mobile user terminal, a series of “instantaneous” channel matrices \mathbf{H} for the mobile user terminal of interest at different times is provided.

For each such “instantaneous” channel matrix \mathbf{H} for the mobile user terminal of interest, the interface variable C is evaluated in a processor 26 for the particular mobile user terminal of interest using Equation (3). The value of variable C is then used to estimate FER for that link by looking up the pre-computed link level FER versus C and E_b/N_o calibration data stored in a memory 28. This is done for each link of interest.

Page 3, lines 23-25, replace paragraph as follows:

For ease of explanation, an example of a known approach is was described, in the “Description of the Related Art” section. This is now followed by an example of the approach according to the invention. This is for ease of comparison.

Page 3, line 26 to Page 6, line 2, delete text (it has been moved to Page 2, after line 8, as indicated above).